

	A	B	C	D	E	F	G	H	I	J	K	L
1	User Selected Options			Background Statistics for Data Sets with Non-Detects								
2												
3	Date/Time of Computation			7/30/2013 11:40:45 AM								
4	From File			WorkSheet.xls								
5	Full Precision			OFF								
6	Confidence Coefficient			95%								
7	Coverage			95%								
8	rent or Future K Observations			1								
9	mber of Bootstrap Operations			2000								
10												
11	DDx											
12												
13	General Statistics											
14	Total Number of Observations				67	Number of Missing Observations					0	
15	Number of Distinct Observations				61							
16	Number of Detects				47	Number of Non-Detects					20	
17	Number of Distinct Detects				47	Number of Distinct Non-Detects					14	
18	Minimum Detect				0.2	Minimum Non-Detect					0.18	
19	Maximum Detect				6.695	Maximum Non-Detect					1.8	
20	Variance Detected				1.365	Percent Non-Detects					29.85%	
21	Mean Detected				2.022	SD Detected					1.168	
22	Mean of Detected Logged Data				0.515	SD of Detected Logged Data					0.693	
23												
24	Critical Values for Background Threshold Values (BTVs)											
25	Tolerance Factor K (For UTL)				1.994	d2max (for USL)					3.068	
26												
27	Normal GOF Test on Detects Only											
28	Shapiro Wilk Test Statistic				0.893	Shapiro Wilk GOF Test						
29	5% Shapiro Wilk Critical Value				0.946	Data Not Normal at 5% Significance Level						
30	Lilliefors Test Statistic				0.127	Lilliefors GOF Test						
31	5% Lilliefors Critical Value				0.129	Detected Data appear Normal at 5% Significance Level						
32	Detected Data appear Approximate Normal at 5% Significance Level											
33												
34	Kaplan Meier (KM) Background Statistics Assuming Normal Distribution											
35	Mean				1.563	SD					1.208	
36	95% UTL95% Coverage				3.972	95% KM UPL (t)					3.593	
37	90% KM Percentile (z)				3.111	95% KM Percentile (z)					3.55	
38	99% KM Percentile (z)				4.373	95% KM USL					5.269	
39												
40	DL/2 Substitution Background Statistics Assuming Normal Distribution											
41	Mean				1.566	SD					1.206	
42	95% UTL95% Coverage				3.971	95% UPL (t)					3.593	
43	90% Percentile (z)				3.111	95% Percentile (z)					3.55	
44	99% Percentile (z)				4.372	95% USL					5.266	
45	DL/2 is not a recommended method. DL/2 provided for comparisons and historical reasons											
46												
47	Gamma GOF Tests on Detected Observations Only											
48	A-D Test Statistic				0.915	Anderson-Darling GOF Test						
49	5% A-D Critical Value				0.757	Data Not Gamma Distributed at 5% Significance Level						
50	K-S Test Statistic				0.133	Kolmogrov-Smirnoff GOF						
51	5% K-S Critical Value				0.13	Data Not Gamma Distributed at 5% Significance Level						
52	Data Not Gamma Distributed at 5% Significance Level											
53												
54	Gamma Statistics on Detected Data Only											
55	k hat (MLE)				2.798	k star (bias corrected MLE)					2.634	
56	Theta hat (MLE)				0.723	Theta star (bias corrected MLE)					0.768	
57	nu hat (MLE)				263	nu star (bias corrected)					247.6	
58	MLE Mean (bias corrected)				2.022							
59	MLE Sd (bias corrected)				1.246	95% Percentile of Chisquare (2k)					11.48	
60												
61	Gamma ROS Statistics using Imputed Non-Detects											
62	GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs											

	A	B	C	D	E	F	G	H	I	J	K	L
63	GROS may not be used when kstar of detected data is small such as < 0.1											
64	For such situations, GROS method tends to yield inflated values of UCLs and BTVs											
65	For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates											
66	Minimum				0.01	Mean				1.567		
67	Maximum				6.695	Median				1.275		
68	SD				1.209	CV				0.771		
69	k hat (MLE)				1.525	k star (bias corrected MLE)				1.467		
70	Theta hat (MLE)				1.027	Theta star (bias corrected MLE)				1.068		
71	nu hat (MLE)				204.4	nu star (bias corrected)				196.6		
72	MLE Mean (bias corrected)				1.567	MLE Sd (bias corrected)				1.293		
73	95% Percentile of Chisquare (2k)				7.7	90% Percentile				3.282		
74	95% Percentile				4.111	99% Percentile				5.986		
75	The following statistics are computed using Gamma ROS Statistics on Imputed Data											
76	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
77					WH	HW					WH	HW
78	Approx. Gamma UTL with 95% Coverage				4.902	5.274	95% Approx. Gamma UPL				4.109	4.33
79	95% Gamma USL				8.383	9.712						
80												
81	The following statistics are computed using gamma distribution and KM estimates											
82	Upper Limits using Wilson Hilferty (WH) and Hawkins Wixley (HW) Methods											
83	k hat (KM)				1.675	nu hat (KM)				224.5		
84					WH	HW					WH	HW
85	Approx. Gamma UTL with 95% Coverage				4.877	5.188	95% Approx. Gamma UPL				4.086	4.264
86	95% Gamma USL				8.346	9.526						
87												
88	Lognormal GOF Test on Detected Observations Only											
89	Shapiro Wilk Test Statistic				0.907	Shapiro Wilk GOF Test						
90	5% Shapiro Wilk Critical Value				0.946	Data Not Lognormal at 5% Significance Level						
91	Lilliefors Test Statistic				0.164	Lilliefors GOF Test						
92	5% Lilliefors Critical Value				0.129	Data Not Lognormal at 5% Significance Level						
93	Data Not Lognormal at 5% Significance Level											
94												
95	Background Lognormal ROS Statistics Assuming Lognormal Distribution Using Imputed Non-Detects											
96	Mean in Original Scale				1.589	Mean in Log Scale				0.183		
97	SD in Original Scale				1.185	SD in Log Scale				0.789		
98	95% UTL95% Coverage				5.788	95% BCA UTL95% Coverage				4.998		
99	95% Bootstrap (%) UTL95% Coverage				4.522	95% UPL (t)				4.521		
100	90% Percentile (z)				3.3	95% Percentile (z)				4.395		
101	99% Percentile (z)				7.523	95% USL				13.5		
102												
103	Background DL/2 Statistics Assuming Lognormal Distribution											
104	Mean in Original Scale				1.566	Mean in Log Scale				0.131		
105	SD in Original Scale				1.206	SD in Log Scale				0.86		
106	95% UTL95% Coverage				6.333	95% UPL (t)				4.837		
107	90% Percentile (z)				3.432	95% Percentile (z)				4.691		
108	99% Percentile (z)				8.428	95% USL				15.95		
109	DL/2 is not a Recommended Method. DL/2 provided for comparisons and historical reasons.											
110												
111	Nonparametric Distribution Free Background Statistics											
112	Data appear to follow a Discernible Distribution at 5% Significance Level											
113												
114	Nonparametric Upper Limits for BTVs(no distinction made between detects and nondetects)											
115	Order of Statistic, r				66	95% UTL with95% Coverage				4.998		
116	Approximate f				1.737	Confidence Coefficient (CC) achieved by UTL				0.854		
117	95% UPL				3.263	95% USL				6.695		
118	95% KM Chebyshev UPL				6.867							
119												
120	Note: The use of USL to estimate a BTV is recommended only when the data set represents a background											
121	data set free of outliers and consists of observations collected from clean unimpacted locations.											
122	The use of USL tends to provide a balance between false positives and false negatives provided the data											
123	represents a background data set and when many onsite observations need to be compared with the BTV.											
124												